

Original Article

The Efficacy of Emotion Regulation Skills in Patients with Irritable Bowel Syndrome: Reduction of Psychopathological Symptoms and Improvement in Quality of Life: a case series

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Abstract

Introduction: Emotion regulation therapy (ERT) is one of the third generations of cognitive behavioral therapies, which address patients' problem by improving four emotion regulation skills (i.e. mindfulness, allowing or acceptance, distance, and reappraisal). ERT could be applied for abnormalities with strong emotional element. Therefore, this study aims to determine the efficacy of emotion regulation skills on reduction of psychopathological symptoms, difficulty of emotion regulation and improvement of quality of life in patients with irritable bowel syndrome (IBS).

Methods: In an experimental single-case design of baseline type, 5 patients with irritable bowel syndrome (IBS) were included in the therapy process after they satisfied necessary condition. The patients had 9 sessions therapy (i.e. 90 minutes). In order to evaluate efficacy of the therapy, the measures of Depression Anxiety Stress Scale (DASS-21), Difficulty in Emotion Regulation Scale (DERS) and Irritable Bowel Syndrome Quality Of Life (IBS-QOL34) were used. To analyze the collected data, certain diagrams, reliable change index, improvement percentage, and corrected size effect (i.e. Hedges' g) were used.

Results: The emotion regulation therapy reduced the psychopathological symptoms, difficulty of emotion regulation and increase of quality of life in patients with IBS. Total percentages of improvement of anxiety, depression, difficulty of emotion regulation and quality of life were 32.25, 34.68, 40.21 and 58.44 percent respectively.

Conclusion: The ERT reduced psychopathological symptoms and difficulty of emotion regulation and improved quality of life in patients with irritable bowel syndrome significantly. Consequently, therapists seem to be able to use the skills of this treatment to reduce the psychological problems of these patients.

Declaration of Interest: None.

Key words: Emotion regulation therapy, Irritable bowel syndrome, Quality of life, Anxiety and depression.

Introduction

IBS is one of the common digestive diseases, which affects the majority of

individuals. Despite the absence of organically specific etiology, certain symptoms of the disease such as chronic abdominal pain, diarrhea, constipation or bloating affect their

quality of life. The irritable bowel syndrome is a disease of young age which manifests itself in most of people before they reach the age of 45 years old (1). The syndrome is more prevalent in women than men and it is chronic in nature (2). About 12 percent of patients visiting general clinics and 25-30 percent of patients visiting gastroenterology clinics are patients with irritable bower syndrome (3). Based on Rome-III diagnostic criteria, a functional disease or intestinal disorders is the one characterized by recurrent abdominal pain or discomfort for at least three times for the past three months or since last six months. In addition, the disease should satisfy two or more of following criteria:

- 1- Improve abdominal pain by bowel movements.
- 2- Initiation of abdominal pain following a change in frequency of bowel movements.
- 3- Initiation of abdominal pain following a change in consistency of stool (4).

The association of IBS with excessive activity of hypothalamus-pituitary-adrenal axis and increase of pre-inflammatory cytokines is already supported (5). On the other hand, IBS is highly affected by psychological, social and psychiatric factors (6). The psychological factors and autonomous nervous system are related to etiology of IBS. Emotional states and personality traits might affect physiology of intestines and play a role in experience and change of the symptoms (7). Today, it is claimed that psychological claims could improve intestinal symptoms through modification of emotion and mood. The methods could also help the patients with organic gastrointestinal disorders (8).

Depression is one of the common problems of patients with irritable bowel syndrome which plays a significant role in reduction of mental health of these patients (9). Numerous studies suggest that quality of life of patients with IBS is lower than general community (10). The findings of Pinto et al., suggest that 50 percent of patients with irritable bowel syndrome underwent anxiety and depression (11). Anxiety and depression could directly lead to use of an improper coping process for such patients. Passive or inefficient coping could lead to increase of physical symptoms and

disability and distress due to concern with controlling of physical symptoms (12). The review of papers published worldwide on effectiveness of cognitive behavior therapy on symptoms of irritable bowel symptoms and their management, cognitive-behavioral therapists suggested that the therapy exerts significant effects by reduction of psychological distress and improvement of symptoms (13). In recent years, because of complexity and diversity of problems of some disorders mindfulness is widely used for improvement of symptoms of depression and anxiety. It is already supported that mindfulness-based techniques contribute to reduction of symptoms of stress and pain (14). These techniques could reduce the symptoms of stress and pain and improve the symptoms of fibromyalgia and depression. In another study, the results suggested that mindfulness-based therapy could reduce the physical symptoms of IBS (15). In fact, one of the new therapies of IBS is metacognitive therapy, which is based on mindfulness. The use of mindfulness-based approaches and therapy based on acceptance could reduce physical symptoms, anxieties, and experiential avoidance (16). The meta-analytical findings of Hoffman et al (2010) suggest that mindfulness-based therapies could reduce the symptoms of depression and anxiety (17).

During recent years, significant worldwide interest in study of the role of emotion regulation in mental health and development of diseases has emerged. Moreover, role of disorder in regulation of emotion, prevalence and persistence of some diseases such as mental illnesses (18) and psychosomatic diseases such as functional gastrointestinal disorders have been identified (19). Most of previously studies address the two skills of mindfulness attention (i.e. ability to focus and keep attention and flexibility of attention) and acceptance (ability to be open, to allow and to stay in contact with emotional experience). However, one of the new psychological therapies is Emotion Regulation Therapy (ERT) which addresses the two skills mentioned above along with distancing skills (i.e. ability to identify, observe and develop a psychological approach to personal

experience) and reappraisal (i.e. ability to change one’s evaluation of an event which changes emotional load of a subject).

ERT is based on emotion dysregulation model of emotional disorders. The model is comprised of four basic components. The first component suggests that people with emotional disorder have 1. emotional hyperarousal, 2. Poor understanding of emotions, 3. Negative attitudes about emotions and 4. maladaptive emotion regulation and management (20).

Since comorbidity of emotional disorders and depression in IBS patients is high and emotion dysregulation model was designed for patients with comorbidity of anxiety and depression, this therapy is a better choice for IBS patients. As a result, the goal of current study is efficacy of ERT for IBS patients?

Methods

This study is a clinical trial, which used single case experimental design of multiple baseline type. The single case experimental design offers numerous positive characteristics among which one could point to relative control over therapy conditions, persistent measurement and development of baseline. In this study, 5 patients with symptoms of irritable bowel syndrome who visited consultation center and clinic of Imam Reza University during spring of 2016 and who had been diagnosed by gastroenterologist as patients with irritable bowel syndrome (based on Rome-III criteria) were included in the survey through purposeful sampling. The inclusion criteria of IBS diagnosis based on Rome-III criteria are age range of 18-40 years, lack of severe mental disorders, and lack of personality disorders of clusters A and B (In this study, SCID-II was used for diagnosis of personality disorder) and no record of

psychotherapy for dealing with irritable bowel syndrome in past six months (in the case of taking drugs, their types and amounts had to remain constant during the period of study) and minimum education of sixth grade for filling out intended questionnaires and scales. The exclusion criteria were included the absence from three consequent therapy sessions, non-completion of intended exercises of three consequent sessions, and lack of participation during follow-up period. Since this study is interventional type, the moral criteria of Iranian Organization of Psychology and Counseling were considered. Coding of ethics was obtained from the University by the number (Kums.Rec.1396.5). The means of research include DASS, DERS, and IBS-QOL34. In the baseline, therapeutic targets (i.e. depression, anxiety, quality of life and emotion dysregulation) were measured at two-week interval so that a comparative baseline could be developed. In the next step, the therapeutic intervention of ERT base was used on guidelines of the book “Emotion Regulation Therapy”(21). At the end of first, third, sixth and ninth sessions, the therapeutic targets were evaluated. After therapy ended, the targets were re-evaluated at follow-up of next two months. Percent of recovery for each patient is calculated. Furthermore, Hedges' g was utilized to calculate effect size estimates. Effect size estimates were interpreted conservatively, with 0.2, 0.5, and 0.8 reflecting small, medium, and large effects.

Summary of Therapeutic Sessions

The structure of therapeutic and emotion regulation skill sessions are as detailed in the following:

Table 1. A sample session-by-session treatment plan

Skills	Outline	sessions
Attending skill: mindful diaphragmatic breathing	Introduction to emotion regulation perspective and treatment	1
Attending skill: mindful body and muscle awareness	Intense emotions and the motivation for security and reward	2
Attending skill: mindfulness of emotions	Action, learning consequences, opposite orientation	3

Skill: open presence meditation	Allowance and pause allowing	4
Distancing skill: perspective in time	Cultivating Perspective and Healthy Distance (Part I)	5
Distancing skill: perspective in space	Cultivating perspective and healthy distance (Part II)	6
Reframing skill: courageous and compassionate reappraisal	Reframing (Part I)	7
Reframing skill: courageous and compassionate reappraisal (continued)	Reframing (Part II)	8
	Skills practice introducing values exploring between session valued actions	9

Depression Anxiety Stress Scale (DASS-21)

The scale consists of 21 items, which are scored according to Likert scale. The results of confirmatory factor analysis suggest that 68 percent of total variance of the scale is due to three measures of stress, depression and anxiety. The Cronbach's alpha coefficients of stress, depression and anxiety were 0.97, 0.92, and 0.95 respectively (22). The validity and reliability of the questionnaire distributed between Iranian students suggest that test-retest reliabilities of depression, anxiety and stress were 0.80, 0.76, and 0.77 respectively. In addition, Cronbach's alpha coefficients of stress, depression and anxiety scales were 0.81, 0.74, and 0.78 respectively (23).

Difficulties in Emotion Regulation Scale (DERS)

The scale is a complete 36-item tool for measuring the difficulty of emotion regulation (24). This tool evaluates the typical levels of difficulty of emotion regulation and its specific aspects (25). The aspects of this scale include rejection of emotional responses, difficulty of manifestation of purposeful behaviors, difficulty of impulse control, lack of emotional awareness, limited access to emotion regulation strategies and lack of emotional resolution. The responses are scored based on a five-point Likert scale (24). The scale was translated to Persian and normalized by Khanzadeh et al. Their report suggests that validities of the questionnaire sub-scales, as determined through Cronbach's alpha, ranges from 0.66 to 0.88. The test-retest reliability of the scale also ranges between 0.79 and 0.91. The construct validity and criterion-related validity signify acceptable validity and reliability of Persian version of the scale (26).

Irritable Bowel Syndrome Quality of Life (IBS-QOL34)

Patrick and Drossman designed the quality of life scale for patients with irritable bowel syndrome (1988). The scale is one of the best available tools for evaluation of quality of life of these patients (total internal consistency coefficient of the scale: 0.094) (27). The scale includes 34 items which evaluate 8 sub-scales of boredom caused by the disease, social reaction, health anxiety, body image, interpersonal relationships, avoidant / restrictive food intake disorder (ARFID), sexual concern and intervention with daily activity. The scale was first translated by Haqayeq et al and its reliability and validity were reported to be 0.93 and 0.61 respectively (28).

Results

The demographic variables are summarily represented in table 1. The scores and results of using DASS, DERS, IBS-QOL34 and MASS scales at baseline and first, third, sixth and ninth session as well as 2-month follow-up along with improvement percentage and reliable change index (RCI) are shown in separate tables and figures. The improvement percentages of anxiety for first to fifth subjects were equal with 35, 47.05, 43.75, 31.25 and 38.88 percent respectively. The improvement percentages of depression for first to fifth subjects were equal with 40, 46.66, 37.50 and 36.84 percent respectively. The improvement percentages of emotion dysregulation of first to fifth subjects were 40.47, 44.05, 35.34, 37.20, and 37.09 percent respectively. The improvement percentages of quality of life for first to fifth subjects were equal with 55.76, 62.06, 53.63, 59.80 and 60.86 percent respectively. Table 7 shows that effect sizes of all variables of this survey were high which could be used for supporting or denial of the hypotheses.

Table2. Demographic Variables

Subject	Age	Sex	Education
Subject no.1	30	Female	Master's Degree
Subject no.2	24	Female	Bachelor's Degree
Subject no.3	32	Female	Bachelor's Degree
Subject no.4	32	Female	Master's Degree
Subject no.5	27	Female	Bachelor's Degree

Table3. DASS-21 scores of subjects for anxiety aspect at baseline, intervention and follow-up Steps.

Subjects	Baseline	First Session	Third Session	Sixth Session	Ninth Session	Post Therapy	Follow-up Session	Improvement Percentage	Total Improvement Percentage	Reliable Change Index (RCI)
Subject no.1	15	15	15	12	11	10	10	35%		2.31
Subject no.2	17	17	15	13	13	9	9	47.05	32.25	3.70
Subject no.3	16	16	17	14	11	9	9	43.75		3.24
Subject no.4	16	16	15	15	14	11	11	31.25		2.31
Subject no.5	18	18	16	14	11	11	10	38.88		3.71

Table 4. DASS-21 scores of subjects for depression aspect at baseline, intervention and Follow-up Steps.

Subjects	Baseline	First Session	Third Session	Sixth Session	Ninth Session	Post Therapy	Follow-up Session	Improvement Percentage	Total Improvement Percentage	Reliable Change Index (RCI)
Subject no.1	15	15	14	12	12	11	9	40		2.77
Subject no.2	15	15	15	11	12	9	8	46.66	34.68	3.24
Subject no.3	17	17	16	14	12	8	8	52.94		4.16
Subject no.4	16	16	14	12	13	11	10	37.50		2.77
Subject no.5	14	14	13	11	10	9	9	36.84		2.31

Table 5. Subjects' scores of emotion regulation difficulty at baseline, intervention and follow-up Steps.

Subjects	Baseline	First Session	Third Session	Sixth Session	Ninth Session	Post Therapy	Follow-up Session	Improvement Percentage	Total Improvement Percentage	Reliable Change Index (RCI)
Subject no.1	135	135	124	110	91	76	71	47.40		3.86
Subject no.2	143	143	134	119	96	82	80	44.05	40.21	3.80
Subject no.3	116	116	106	98	86	73	75	35.34		2.44
Subject no.4	129	129	118	111	93	87	81	37.20		2.86
Subject no.5	124	124	113	102	87	73	78	37.09		2.77

Table 6. Subjects' Scores of Quality of Life at Baseline, Intervention and Follow-up Steps.

Subjects	Baseline	First Session	Third Session	Sixth Session	Ninth Session	Post Therapy	Follow-up Session	Improvement Percentage	Total Improvement Percentage	Reliable Change Index (RCI)
Subject no.1	40	40	55	61	87	98	97	55.76		2.82
Subject no.2	44	44	49	75	94	110	116	62.06	58.44	3.56
Subject no.3	51	51	68	74	89	114	110	53.63		2.91
Subject no.4	41	41	49	57	79	99	102	59.80		3.01
Subject no.5	47	47	68	78	95	112	120	60.86		3.61

Table 7. Descriptive Statistics and Size Effects of Tools of Emotion Regulation Therapy in Pre-test, Post-test and Three-month Follow-up Steps.

Tools	Number of Samples	Before Therapy	After Therapy	Follow-up	Pretest-Posttest Size Effect	Pretest-Follow up Size Effect
		Mean (SD)	Mean (SD)	Mean (SD)	Hedges' g	Hedges' g
DASS-21 (Anxiety)	5	16.40 (1.14)	10 (1)	9.8 (0.836)	5.43	5.78
DASS-21 (Depression)	5	15.40 (1.14)	9.60 (1.34)	8.80 (0.837)	4.21	5.96
Quality of Life (IBS-QOL34)	5	44.60 (4.50)	106.60 (7.53)	109 (9.53)	9.02	7.80
DERS (Emotion Regulation)	5	129.40 (10.31)	78.20 (6.14)	77 (4.06)	5.45	6.04

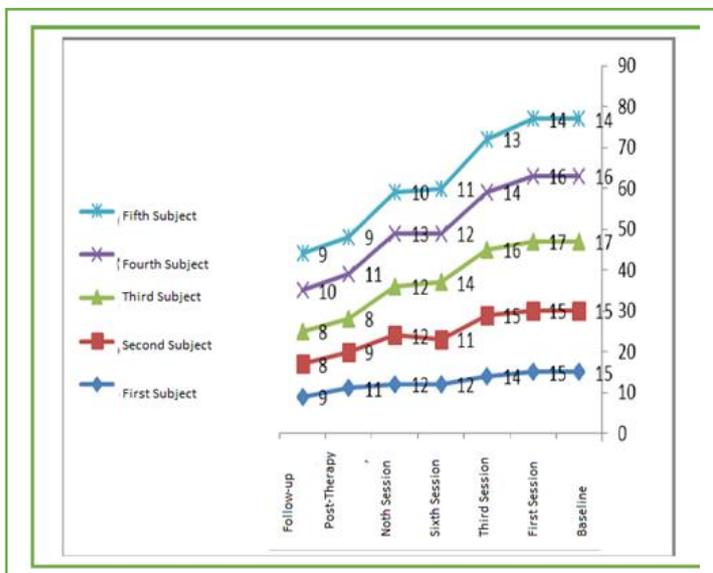


Figure. 2 Patients DASS score of depression

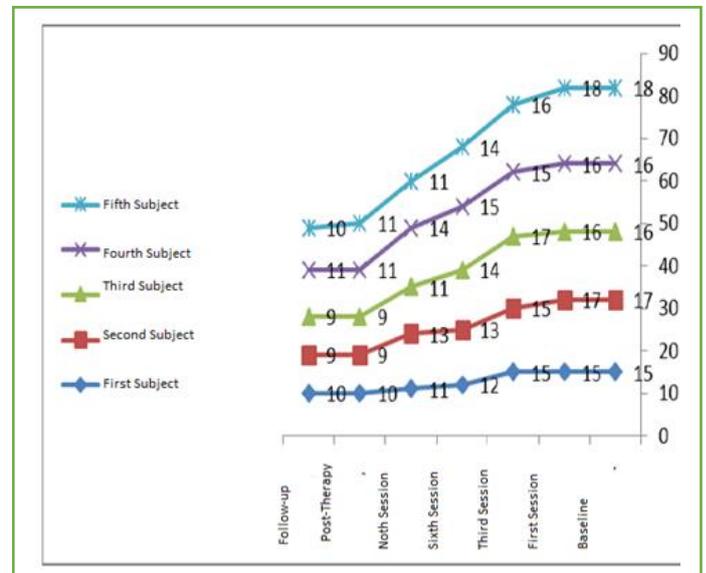


Figure. 1 Patients DASS score of anxiety

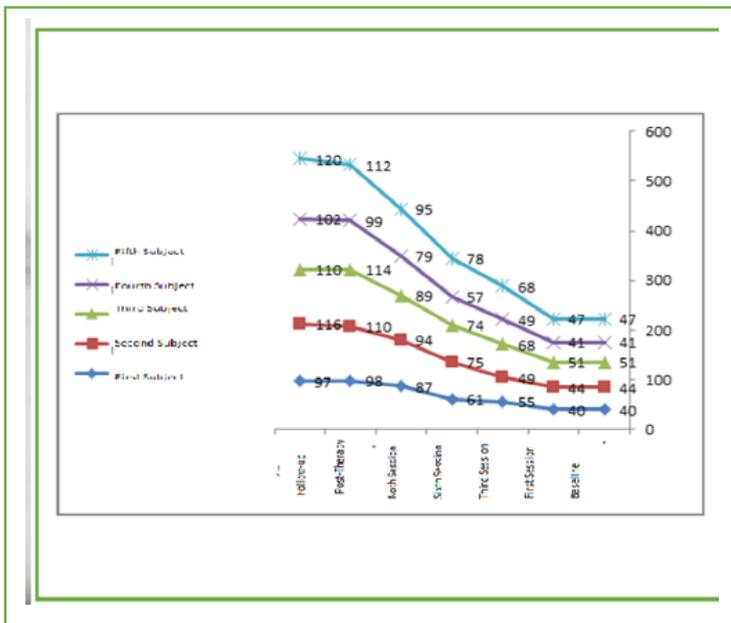


Figure. 4 Scores of patients in IBS-QOL

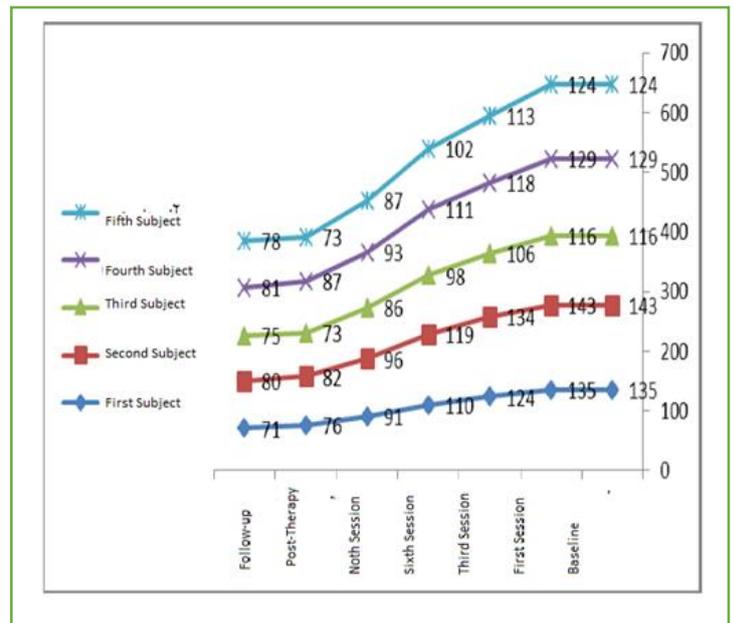


Figure. 3 Scores of patients in DERS

Discussion

The results of present study suggest that emotion regulation skills could reduce depression and anxiety of patients with irritable bowel syndrome. Although previously conducted studies on emotion regulation intervention based on ERT protocol are limited in number, the results of present study are supported by findings of other studies on influence of emotion-focused trans diagnostic treatment on emotional disorders (e.g. depression and anxiety) (29-31). On the other hand, the findings of this research are in line with results of other studies, which indicate the benefit and efficacy of dialectical behavior therapy as one of the third wave of cognitive behavioral therapies on chronic diseases and physical-psychological problems. For instance, Salehi et al (32) studied the effects of two methods of Gross model-based emotion regulation training and dialectical behavior therapy on reduction of emotional problems. Their study results showed that both methods reduce symptoms of anxiety but training based on dialectical behavior therapy solely reduced the symptoms of depression (33). In addition, the results of Mohammadi et al. Are in line with the findings of this study. The later

authors conducted a study on effect of dialectical behavior therapy on patients with irritable bowel syndrome and found out that the intervention is an effective treatment for reduction of patients' anxiety (34). Recent studies suggest that mindfulness is influential on physical and psychological symptoms of patients with irritable bowel syndrome. Therefore, the method could reduce anxiety (35) and increase quality of life and joy of living of such patients (36). For instance, Moqtadai et al (37) found out that mindfulness training could affect physical and psychological symptoms of patients with irritable bowel syndrome. Therefore, as one of the third wave of cognitive behavioral therapies the mindful training could be a proper therapy for improvement of physical and mental health such as anxiety and depression in different groups of patients with chronic digestive problems (38, 39). These studies have trained attention and mindfulness, but in the present study four skills of mindfulness, acceptance, distancing and reappraisal were trained. In explaining the findings of the present study, the reference to emotion regulation therapy protocol seems to be necessary. As Mennin (40) suggested, the four Component of mindfulness, acceptance

and re-evaluation are though in emotion regulation therapy. As a result, mindfulness helps patients understand that emotions should not necessarily be approved or suppressed. In contrast, the patient should pay flexible but directed attention to those emotions at real time. He should accept that emotion regulation helps in tackling those false emotional beliefs that patients with irritable bowel syndrome subscribe. The patients are encouraged to observe the emotions and distinguish between them so that use of such emotions enable them to obtain more general meaning and to reduce experiences of undesirable emotions.

Another skill addressed by emotion regulation therapy is acceptance. In this case, the person remains in touch with his emotional experience and he/she does not attempt to extend or prevent it (21). Heyes (1994) defined acceptance as complete admission of events without resisting them and as they are. He suggests that most of problems people have are rooted in their efforts to control or maintenance of personal experience. Lack of acceptance of experiences cause people to engage in non-adaptive strategies such as worry, drowning in thoughts or self-criticism. The other two skills (i.e. distancing and reappraisal) effectively reduce anxiety and concern. Safran and Segal defined distancing as a person's ability to observe thoughts and feelings in moment namely the objective events in the mind which do not necessarily reflect the person himself (41). Distancing could cause a person not to drown in his strong emotions, negative thoughts and annoying feelings. Finally, reappraisal reduces obsession and anxiety. In emotion regulation therapy, compassionate reappraisal is emphasized. Numerous studies point to effect of compassion-based interventions on reduction of anxiety and obsession (42).

The other findings of present study suggest that emotion regulation skills reduced emotion dysregulation significantly. this findings are supported by results of Mennin et al (2015) who suggested that emotion regulation therapy through training of mindfulness, acceptance and distancing skills could reduce emotion regulation problems (43).

During inconvenience moments, the patients with irritable bowel syndrome use ineffective solutions since they are unfamiliar or insufficiently familiar with effective methods of coping with negative emotions. Lack of adaptive strategies or inappropriate use of such strategies could reinforce emotional problems and provide the conditions for development or increase of symptoms of irritable bowel syndrome. The use of effective emotion regulation strategies reduces one's criticism of internal experiences and increases mindfulness. The use of at least one of the adaptive strategies (with or without use of accompanying non-adaptive strategy) leads to more development than the events for which no adaptive strategies are used. The first scenario might address patients' emotion regulation problems.

It seems that when a person does not use of effective emotion regulation skills, his perception of emotions is weaker and his reaction to those emotions is negative. The emotion regulation skills result in a healthy association with emotions. The skills allow people to experience and express emotions mildly without engaging with them less than natural state (e.g. experiential avoidance) and more than natural state (e.g. obsession).

The final finding of this study is that emotion regulation skills led to higher quality of life of patients with irritable bowel syndrome. The finding is supported by results of Mazaheri et al and Melin et al. Mazaheri et al suggested that emotion regulation based intervention can effectively reduce emotional symptoms of IBS patients and increase their quality of life (44). Melin et al (45) conducted a primary study and evaluated the effect of an emotion-based therapy model on multiple variables such as quality of life of 54 patients with psychosomatic disorders. The results suggested significant increase in quality of life of those patients. Similar to results of present study, other psychological interventions premised on cognitive therapy or cognitive-behavior therapy (46-48) pointed to effectiveness of this type of therapies on quality of life of patients with functional gastrointestinal disorders (FGIDs) especially irritable bowel syndrome.

In regard to effectiveness of ERT on quality of life of patients with irritable bowel syndrome, one could suggest that higher emotional awareness, flexibility of evaluation, prevention from emotional avoidance and coping with emotional symptoms could enhance quality of life of patients. The patients should address stressful events as learning opportunity and not a security threat. As a result, they will experience less physiological disorders and benefit from higher quality of life.

Conclusion

In sum, ERT could reduce the emotional problems (e.g. anxiety and depression) and improving the quality of life of patients with irritable bowel syndrome. This study supports the efficacy of this protocol on treatment IBS. The present study can be considered as an initial research on the use of emotion regulation skills in patients with irritable bowel syndrome, which can be studied in a wider scale based on its promising results. Due to comorbidity of emotional problems with functional gastrointestinal disorders, emotion regulation therapy could be effectively used for treatment of patients who visit psychosomatic clinics.

Limitations

Among limitations of present study, one could point to limited sampling (i.e. Kermanshah University of Medical Sciences and one of the city clinics), using of female subjects as samples, self-reporting of intended variables, short-term follow-up time and limited generalizability of findings because of opting for case study of the subject.

Suggestions

Based on limitations of present study, stronger controlled designs should be used to increase external validity of the findings. In addition, mediating role of each emotion regulation strategies (i.e. mindfulness, reappraisal, acceptance and distancing) in reduction of symptoms of irritable bowel syndrome should be addressed more thoroughly. Since ERT is one of third wave of cognitive behavioral therapies, comparison of it with other therapies is recommended to highlight the role of other emotion regulation strategies in therapy. In

addition, it is suggested that future studies address the effect of ERT in longer-term follow up.

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References

1. Grundmann O, Yoon SL. Irritable bowel syndrome: Epidemiology, diagnosis and treatment: An update for health-care practitioners. *Journal of gastroenterology and hepatology*. 2010;25(4):691-9.
2. Lovell RM, Ford AC. Global prevalence of and risk factors for irritable bowel syndrome: a meta-analysis. *Clinical Gastroenterology and Hepatology*. 2012;10(7):712-21. e4.
3. Ganji A, Safavi M, Nourai S, Nasseri-Moghadam S, Merat S, Vahedi H, et al. Digestive and liver diseases statistics in several referral centers in Tehran, 2000-2004. *Govaresh*. 2006;11(1):33-8.
4. Kaplan HI, Sadock BJ. *Synopsis of psychiatry: Behavioral sciences clinical psychiatry*: Williams & Wilkins Co; 1988.
5. Deary V, Chalder T, Sharpe M. The cognitive behavioural model of medically unexplained symptoms: a theoretical and empirical review. *Clinical psychology review*. 2007;27(7):781-97.
6. Faresjö Å, Grodzinsky E, Johansson S, Wallander M-A, Timpka T, Åkerlind I. Psychosocial factors at work and in every day life are associated with irritable bowel syndrome. *European journal of epidemiology*. 2007;22(7):473-80.
7. Locke GR, Zinsmeister AR, Schleck CD, Talley NJ. Psychosocial distress and somatic symptoms in community subjects with irritable bowel syndrome: a psychological component is the rule. *The American journal of gastroenterology*. 2009;104(7):1772-9.
8. Jones M, Koloski N, Boyce P, Talley NJ. Pathways connecting cognitive behavioral therapy and change in bowel symptoms of IBS. *Journal of psychosomatic research*. 2011;70(3):278-85.
9. Mahvi Shirazi M, Fathi-Ashtiani A, Tabatabaei K, Amini M. Comparison of mental health the mental health levels of patients suffering from irritable bowel syndrome, and inflammatory bowel disease,

- and healthy people. *Research in physiological health*. 2008; 2:75-82
10. Silk DB. Impact of irritable bowel syndrome on personal relationships and working practices. *European journal of gastroenterology & hepatology*. 2001;13(11):1327-32.
 11. Pinto C, Lele M, Joglekar A, Panwar V, Dhavale H. Stressful life-events, anxiety, depression and coping in patients of irritable bowel syndrome. *JAPI*. 2000;48(6).
 12. Crane C, Martin M. Social learning, affective state and passive coping in irritable bowel syndrome and inflammatory bowel disease. *General hospital psychiatry*. 2004;26(1):50-8
 13. Moss-Morris R, McAlpine L, Didsbury L, Spence M. A randomized controlled trial of a cognitive behavioural therapy-based self-management intervention for irritable bowel syndrome in primary care. *Psychological medicine*. 2010;40(1):85-94.
 14. Zernicke KA, Lawlor-Savage L, Lounsbury J, Zhong L, Blustein PK, Campbell TS, et al. Mindfulness-based stress reduction improves distress in two different chronic illnesses. *Journal of Behavioral Health*. 2012;1(3):201-8.
 15. Gaylord SA, Whitehead WE, Coble RS, Faurot KR, Palsson OS, Garland EL, et al. Mindfulness for irritable bowel syndrome: protocol development for a controlled clinical trial. *BMC complementary and alternative medicine*. 2009;9(1):24.
 16. Naliboff BD, Frese MP, Rapgay L. Mind/body psychological treatments for irritable bowel syndrome. *Evidence-Based Complementary and Alternative Medicine*. 2008;5(1):41-50.
 17. Hofmann SG, Sawyer AT, Witt AA, Oh D. The effect of mindfulness-based therapy on anxiety and depression: A meta-analytic review. *Journal of consulting and clinical psychology*. 2010;78(2):169.
 18. Gross JJ, John OP. Mapping the domain of expressivity: multimethod evidence for a hierarchical model. *Journal of personality and social psychology*. 1998;74(1):170.
 19. Porcelli P, Affatati V, Bellomo A, De Carne M, Todarello O, Taylor GJ. Alexithymia and psychopathology in patients with psychiatric and functional gastrointestinal disorders. *Psychotherapy and psychosomatics*. 2004;73(2):84-91.
 20. Behar E, DiMarco ID, Hekler EB, Mohlman J, Staples AM. Current theoretical models of generalized anxiety disorder (GAD): Conceptual review and treatment implications. *Journal of anxiety disorders*. 2009;23(8):1011-23.
 21. Fresco DM, Mennin DS, Heimberg RG, Ritter M. Emotion regulation therapy for generalized anxiety disorder. *Cognitive and Behavioral Practice*. 2013;20(3):282-300.
 22. Antony MM, Bieling PJ, Cox BJ, Enns MW, Swinson RP. Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales in clinical groups and a community sample. *Psychological assessment*. 1998;10(2):176.
 23. Samani S, Jokar B. Reality and validity of short form depression scale of anxiety and stress. *Social and human sciences* 2007;26(3):65-78.
 24. Gratz KL, Roemer L. Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of psychopathology and behavioral assessment*. 2004;26(1):41-54.
 25. Gratz KL, Tull MT. Emotion regulation as a mechanism of change in acceptance-and mindfulness-based treatments. *Assessing mindfulness and acceptance processes in clients: Illuminating the theory and practice of change*. 2010:107-33
 26. Khanzadeh M, Saeediyan M, Hosseinchari M, Edrissi F. Factor structure and psychometric properties of difficulties in emotional regulation scale. *International Journal of Behavioral Sciences*. 2012;6(1):87-96.
 27. Broadbent E, Petrie KJ, Main J, Weinman J. The brief illness perception questionnaire. *Journal of psychosomatic research*. 2006;60(6):631-7.
 28. Haghayegh S, Kalantari M, Solati S, Molavi H, Adibi P. Study on Validity of Farsi Version of Irritable Bowel Syndrome Quality of Life Questionnaire (IBS-QOL-34). *Govaresh*. 2008;13(2):99-105.
 29. Farchione TJ, Fairholme CP, Ellard KK, Boisseau CL, Thompson-Hollands J, Carl JR, et al. Unified protocol for transdiagnostic treatment of emotional disorders: a randomized controlled trial. *Behavior therapy*. 2012;43(3):666-78.
 30. Mohammadi A. Comparison of the effect of transdiagnostic group therapy with group cognitive therapy on indicated prevention of anxiety and depression. Iran: Tehran University of Medical Sciences. 2011.

31. Foroughi AA, Arani AM, Bakhtyari M, Mohammadi A, Habibi M. The Efficacy of Emotion Regulation Therapy (ERT) in Generalized Anxiety Disorder (GAD): symptom reduction and improving of emotion regulation and mindfulness skills. *International Journal of Applied Behavioral Sciences*. 2016;3(1):1-9.
32. Carlson LE, Brown KW. Validation of the Mindful Attention Awareness Scale in a cancer population. *Journal of psychosomatic research*. 2005;58(1):29-33.
33. Salehi A, Baghban I, Bahrami F, Ahmadi SA. The effect of emotion regulation training based on dialectical behavior therapy and gross process model on symptoms of emotional problems. *Zahedan Journal of Research in Medical Sciences*. 2012;14(2):49-55.
34. Azizi A, Mohamadi J. Effectiveness of Dialectical Group Behavior Therapy on Perceived Stress and Depression in Patients with Irritable Bowel Syndrome. *Journal of Ardabil University of Medical Sciences*. 2016;16(1):95-104.
35. Solati Dehkordi K, Nikfarjam M, Sanaei S. Effectiveness of mindfulness-based stress reduction training and drug therapy on quality of life in patients with irritable bowel syndrome in Shahrekord. *Life Science Journal*. 2014;11(9).
36. Bishop SR. What do we really know about mindfulness-based stress reduction? *Psychosomatic medicine*. 2002;64(1):71-83.
37. Moghtadaei K, Kafi M, Afshar H, Ariapouran S, Daghighzadeh H, Pourkazem T. Effectiveness of mindfulness-based cognitive group therapy on somatic symptoms in women with irritable bowel syndrome. *J Res Behav Sci*. 2013;10(7):698-708.
38. Brown KW, Ryan RM. The benefits of being present: mindfulness and its role in psychological well-being. *Journal of personality and social psychology*. 2003;84(4):822.
39. Grossman P, Niemann L, Schmidt S, Walach H. Mindfulness-based stress reduction and health benefits: A meta-analysis. *Journal of psychosomatic research*. 2004;57(1):35-43.
40. Mennin DS. Emotion regulation therapy: An integrative approach to treatment-resistant anxiety disorders. *Journal of Contemporary Psychotherapy*. 2006;36(2):95-105.
41. Hayes SC. Content, context, and the types of psychological acceptance. *Acceptance and change: Content and context in psychotherapy*. 1994:13-32.
42. MacBeth A, Gumley A. Exploring compassion: A meta-analysis of the association between self-compassion and psychopathology. *Clinical Psychology Review*. 2012;32(6):545-52.
43. Mennin DS, Fresco DM, Ritter M, Heimberg RG. An open trial of emotion regulation therapy for generalized anxiety disorder and cooccurring depression. *Depression and anxiety*. 2015;32(8):614-23.
44. Mazaheri M, Manshaee G. Difficulties in Emotion Regulation in IBS Patients and Normal People-with Control Emotional Problems. *Journal of Guilan University of Medical Sciences*. 2016;25(98):70-9.
45. Melin EO, Thulesius HO, Persson BA. Affect School for chronic benign pain patients showed improved alexithymia assessments with TAS-20. *BioPsychoSocial medicine*. 2010;4(1):5.
46. Lackner JM, Jaccard J, Krasner SS, Katz LA, Gudleski GD, Blanchard EB. How does cognitive behavior therapy for irritable bowel syndrome work? A mediational analysis of a randomized clinical trial. *Gastroenterology*. 2007;133(2):433-44.
47. Wang W, Pan G, Qian J. Cognitive therapy for patients with refractory irritable bowel syndrome. *Zhonghua Nei Ke Za Zhi*. 2002;41(3):156-9.
48. Kennedy TM, Chalder T, McCrone P, Darnley S, Knapp M, Jones R, et al. Cognitive behavioural therapy in addition to antispasmodic therapy for irritable bowel syndrome in primary care: randomised controlled trial. *health technology assessment-southampton*. 2006;10(19).